(IS-6) Achieving Irrigation Water Management (IWM) With Irrigation Water Conveyance – Pipeline

Basic requirements:

Irrigation pipelines come in a variety of diameters (4” to 24” are the most common) and a variety of materials (Poly Vinyl Chloride, Steel, Non-reinforced concrete, and Aluminum).

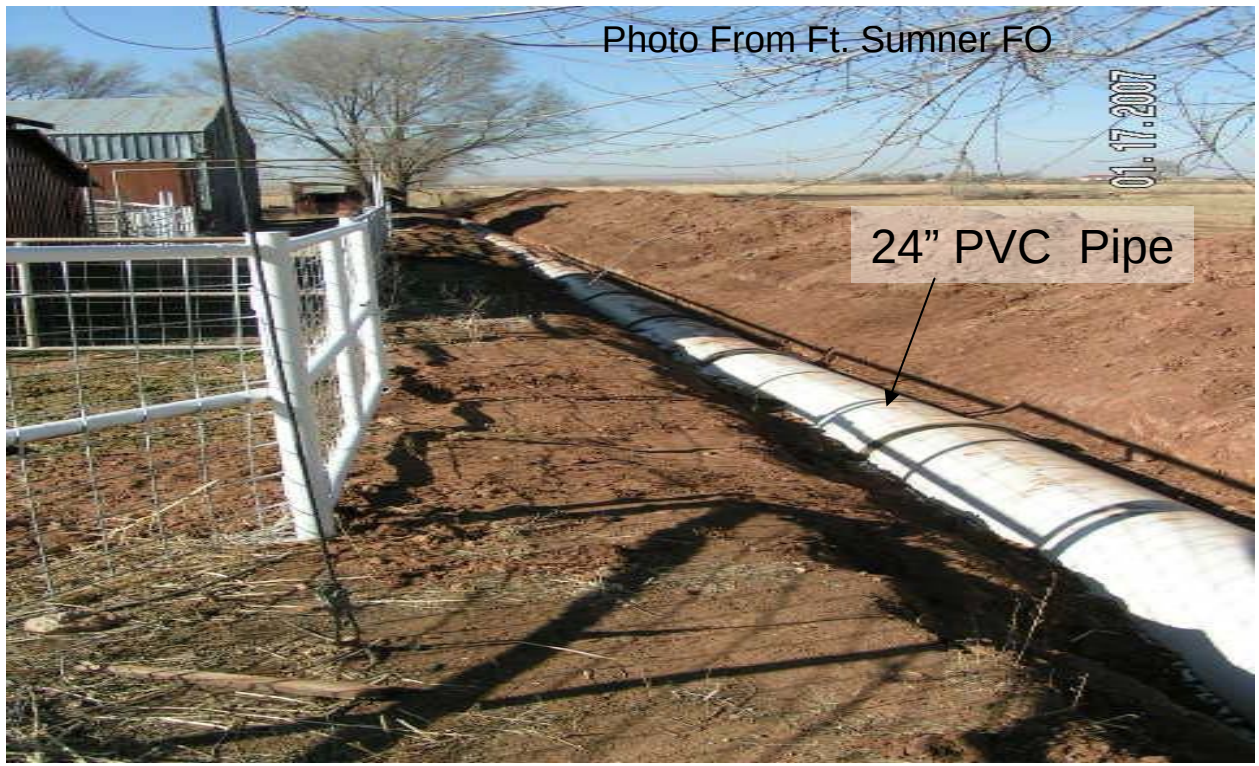
Irrigation pipelines are used with sprinklers, drip systems, and flood applications on a variety of crops.

Benefits:

Increases efficiency of water delivery from well to point of irrigation.

Maintenance is minimal compared to an earthen ditch or concrete lined ditch.

Will work on any field, regardless of shape.



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Friction Loss In Plastic Pipe (Ft / 100 Ft)
(example)

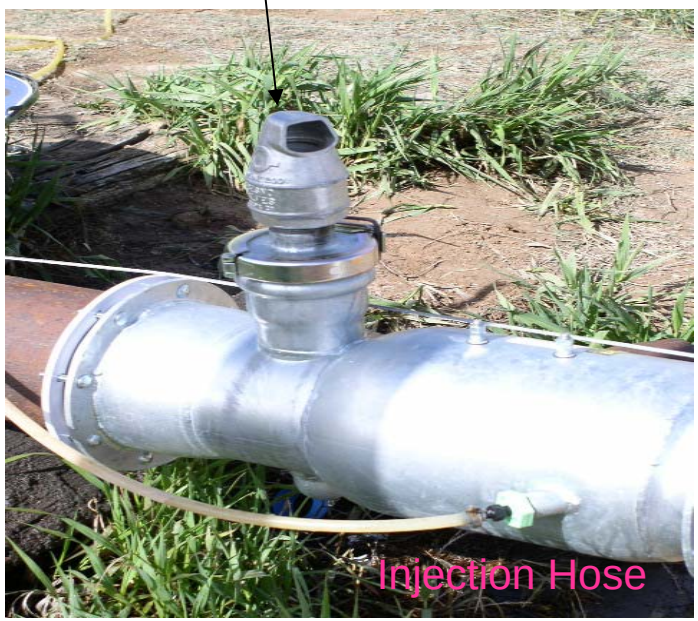
Diameter In Inches											
		8	8	10	10	12	12	15	15	18	18
Flow GPM	Flow CFS	Vel Ft/sec	Hf	Vel Ft/sec	Hf	Vel Ft/sec	Hf	Vel Ft/sec	Hf	Vel Ft/sec	Hf
450	1.00	2.865	0.330	1.833	0.101	1.273	0.038				
600	1.33	3.820	0.588	2.445	0.179	1.698	0.068				
900	2.00	5.730	1.322	3.667	0.402	2.546	0.152				
1500	3.33	9.549	3.672	6.112	1.118	4.244	0.423	2.716	0.129	1.886	0.049
2000	4.44			8.149	1.987	5.659	0.752	3.622	0.229	2.515	0.087
2500	5.56					7.074	1.175	4.527	0.358	3.144	0.135
3000	6.76							5.432	0.515	3.773	0.195
4000	8.89							7.243	0.916	5.030	0.346

To properly size the pipeline diameter, choose a velocity less than 5.0 Ft/sec and a friction loss (Hf) equal to, or less than, 1.0 Ft/100 Ft. Friction loss will vary based on pipe material, pipe diameter, change in elevation, and flow rate.

Note: Cubic Feet Per Second (CFS) x 450 = Gallons Per Minute (GPM)

Pump Discharge Assembly

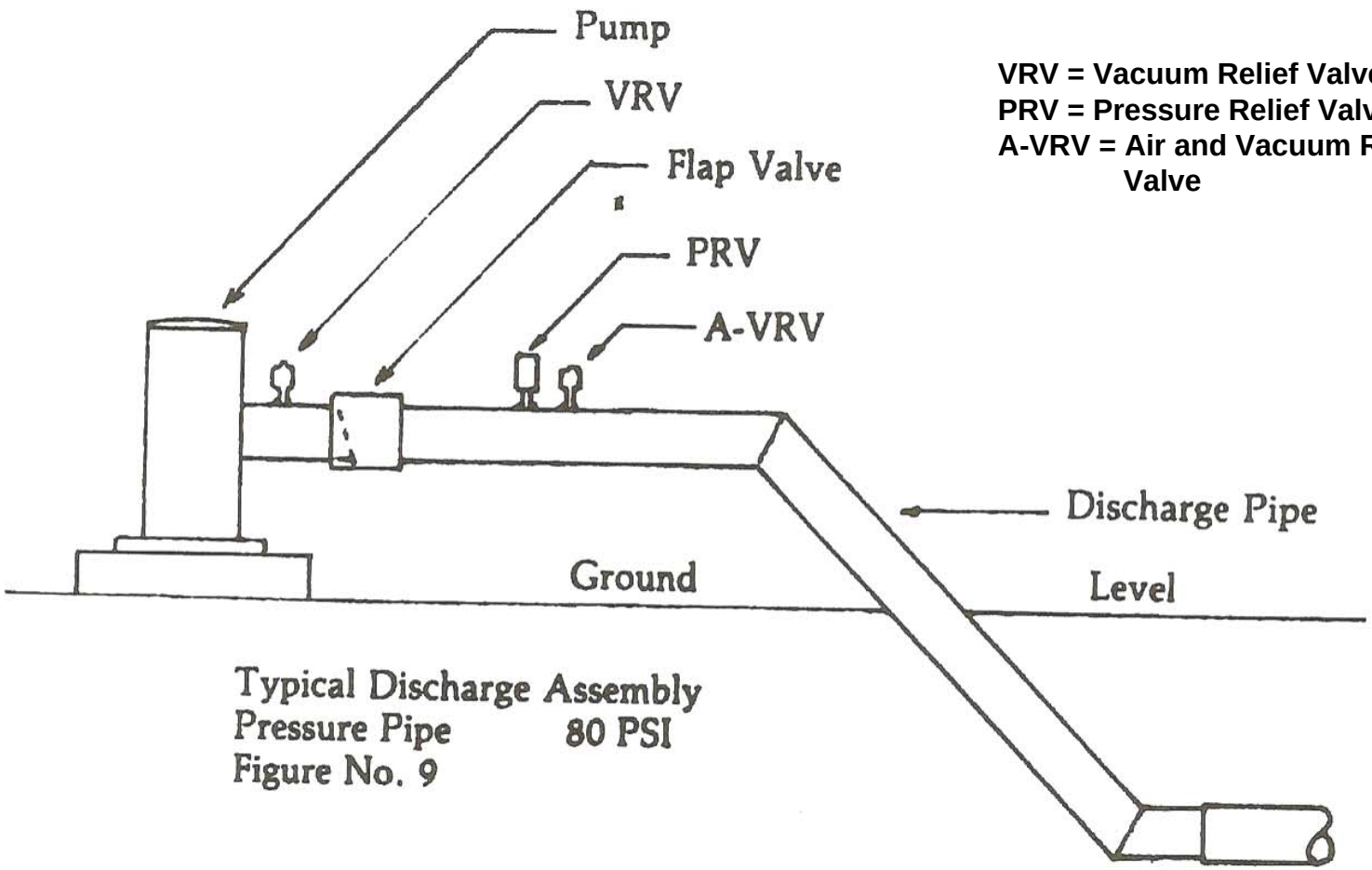
Air Vent & Vacuum
Relief Valve



Chemigation Valve

Photos From Alamogordo FO

Typical Pump Discharge Assembly



VRV = Vacuum Relief Valve
PRV = Pressure Relief Valve
A-VRV = Air and Vacuum Relief Valve

Typical Discharge Assembly
Pressure Pipe 80 PSI
Figure No. 9

Repairs may be made with bolted couplings or gasketed couplings and lengths of plain ended pipe.

Typical Pump Dogleg Assembly

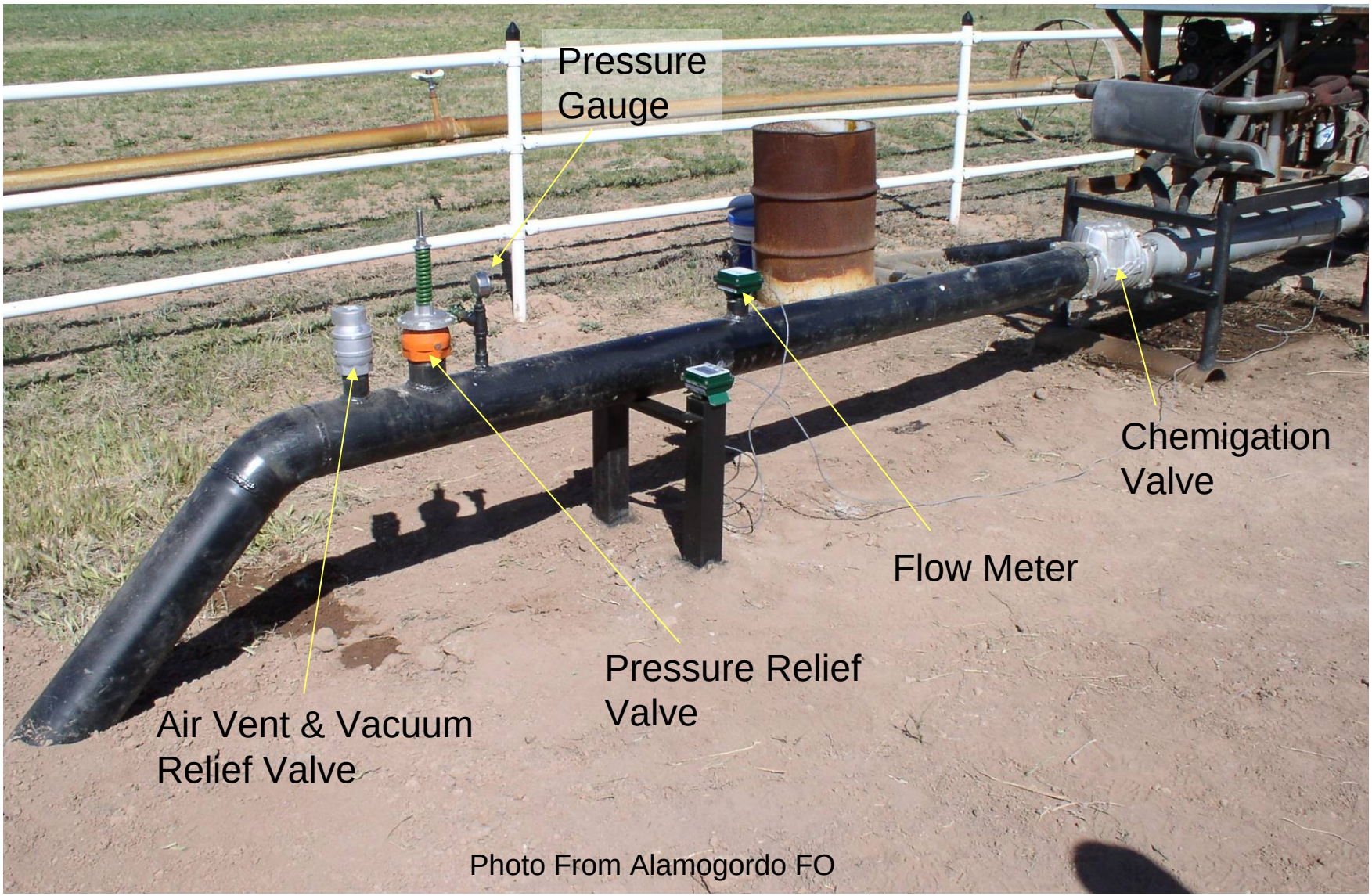
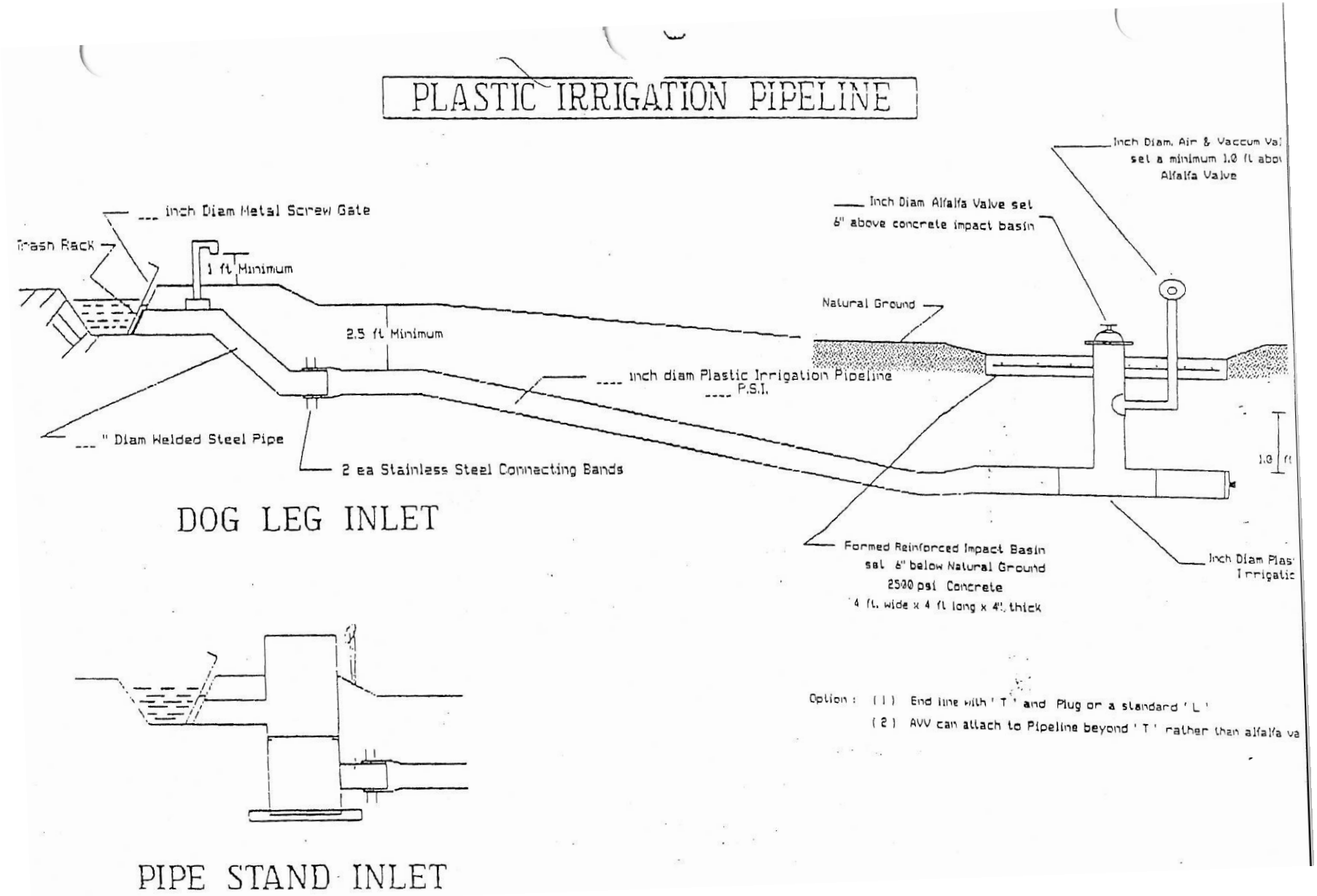
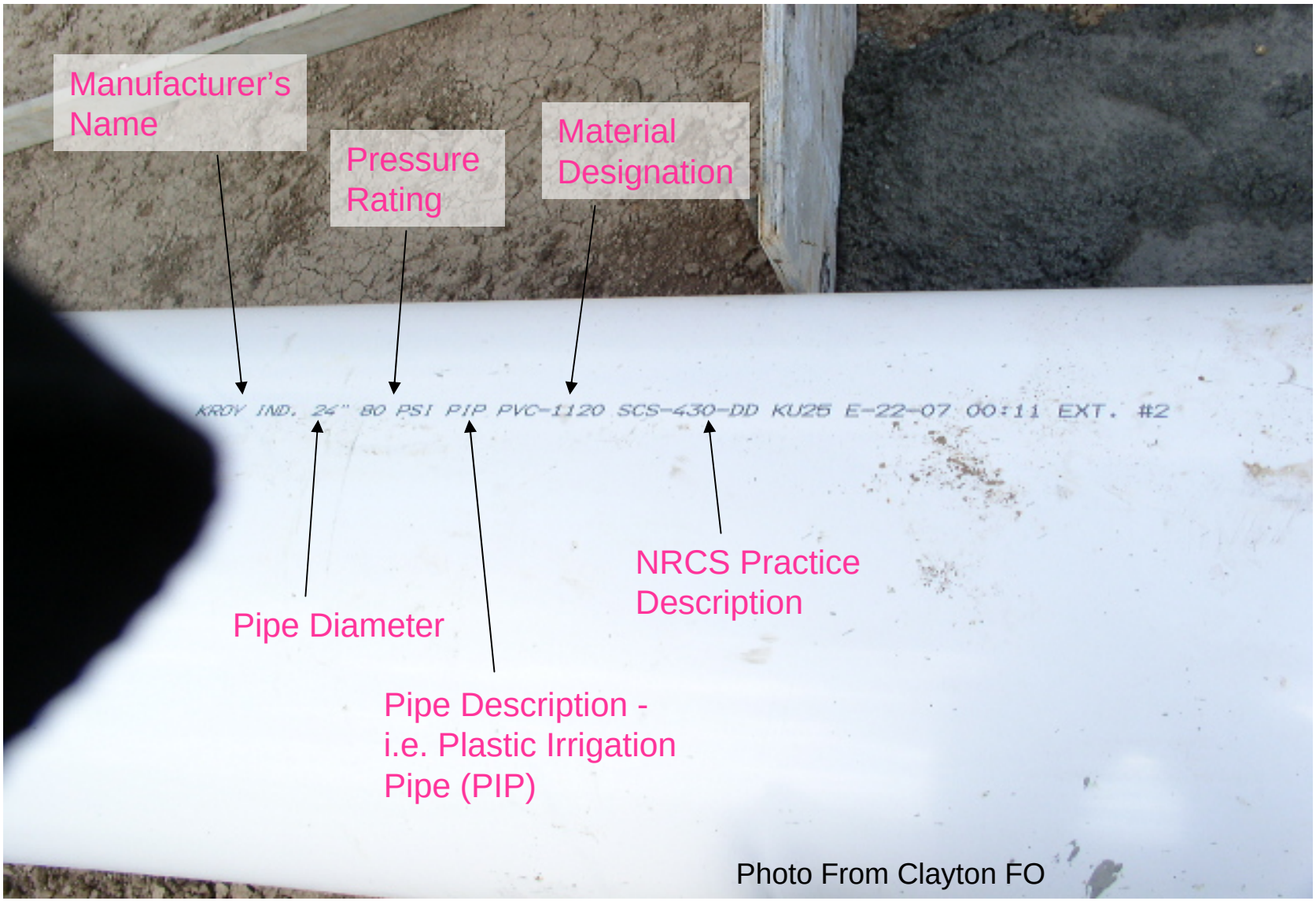


Photo From Alamogordo FO

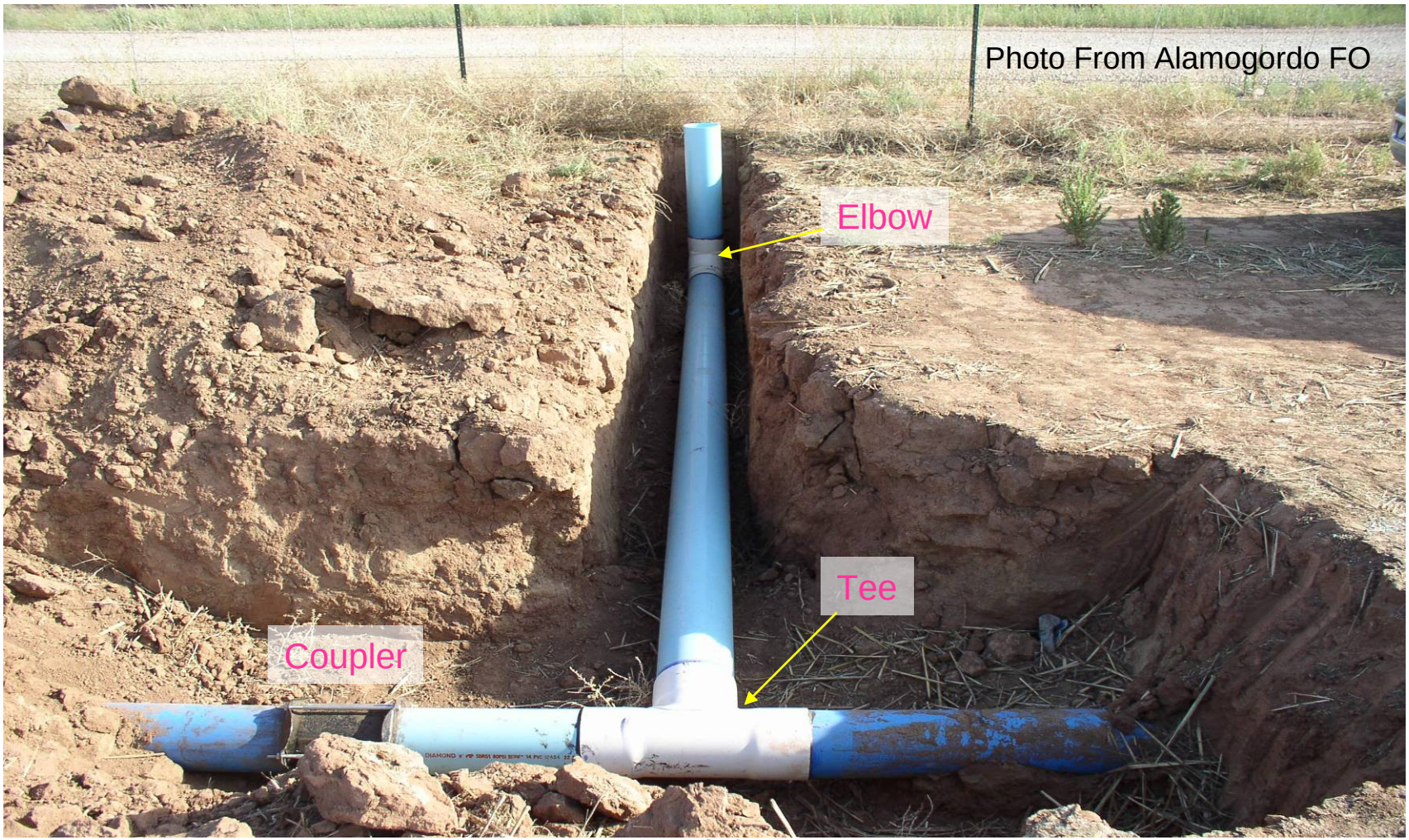
Typical Gravity Discharge Assembly



Plastic Irrigation Pipe Markings
Example



Irrigation Pipeline
Tee and Elbow



Typical Types Of Thrust Blocks

THRUST BLOCKING — Water under pressure exerts thrust forces in piping systems. Thrust blocking should be provided, as necessary, to prevent movement of pipe or appurtenances in response to thrust. Thrust blocking is required wherever the pipeline:

- Changes direction (e.g., tees, bends, elbows and crosses)
- Changes size at its reducers
- Stops as it dead ends
- Valves and hydrants, at which thrust develops when closed

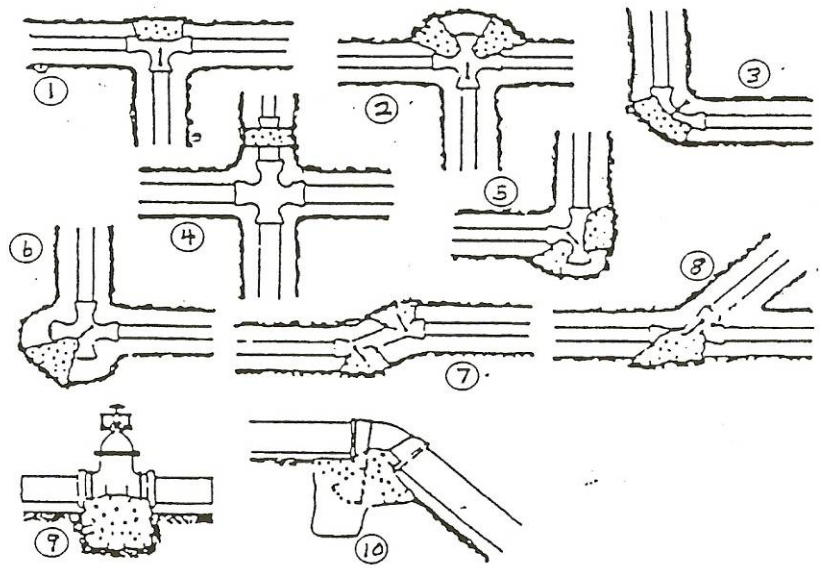
Size and type of thrust blocking depends on:

- Maximum system pressure
- Pipe size
- Appurtenance size
- Type of fittings or appurtenance
- Line profile (horizontal or vertical bends)
- Soil type

TYPES OF THRUST BLOCKING

If thrusts, due to high pressure, are expected, anchor valves as below. At vertical bends anchor to resist outward thrusts.

1. Through line connection, tee
2. Through line connection, cross used as tee
3. Direction change, elbow
4. Change line size, reducer
5. Direction change, tee used as elbow
6. Direction change, cross used as elbow
7. Direction change
8. Through line connection, wye
9. Valve anchor
10. Direction change vertical bend anchor



MINIMUM DEPTH OF COVER

Pipe shall be installed at sufficient depth below the ground surface to provide protection from hazards imposed by traffic crossings, farming operations, freezing temperatures, or soil cracking. The minimum depth of cover for pipe susceptible to any of these hazards shall be:

Pipe Diameter (in.)	Depth of Cover (in.)
½ through 2 ½	18
3 through 5	24
6 or more	30

In areas where the pipe will not be susceptible to freezing and vehicular or cultivation hazards, and the soils do not crack appreciably when dry, the minimum depth of cover may be reduced to:

Pipe Diameter (in.)	Depth of Cover (in.)
½ through 1 ½	6
2 through 3	12
4 through 6	18
6 or more	24

Documentation of Depth of Cover